IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application of

Appellant(s)	:	David L. Chapek
Serial No	:	09/605,293
Filed	:	June 28, 2000
Title	:	**SEMICONDUCTOR DEVICES INCLUDING A LAYER OF POLYCRYSTALLINE SILICON HAVING A SMOOTH MORPHOLOGY**
Docket	:	MIO 0037 VA/40509.118
Examiner	:	Jay C. Kim
Art Unit	:	2815
Conf. No	:	5927

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
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EFS Web Electronic Submission
May 14, 2009

Sir:

REPLY BRIEF ON APPEAL

This Reply Brief is being filed pursuant to the provisions of 37 CFR §41.41(a)(1) in response to the Examiner's Answer mailed March 17, 2009. Arguments responsive to the issues raised in the Answer are set forth below. Pursuant to §41.43(a)(1), the Examiner is requested to acknowledge receipt and enter the reply brief.

REMARKS

Appellant initially wishes to address the Examiner's remarks at page 2 of the Answer with regard to the Summary of Claimed Subject Matter. The Examiner asserts that "the method limitations in the claims should be interpreted in light of the structure formed by that method," and has concluded that the claims "do not require plasma source ion implantation be used as the process for doping the layer of silicon dioxide with hydrogen ions." The Examiner goes on to state that "the structure of a metal contaminant is the same regardless of whether the metal contaminant was introduced by sputtering, diffusion, or any other method or if the metal contaminant was the result of contamination of the original starting substrate."

The Examiner appears to have misinterpreted the claims, which clearly convey that the method by which the silicon dioxide layer is implanted with hydrogen ions directly affects the composition of the final product with regard to the level of metal contaminants in the silicon dioxide layer, i.e., the claims recite that a silicon dioxide layer implanted with hydrogen ions by a plasma source ion implantation process has reduced sputtered metal contaminants in comparison with a layer of silicon dioxide doped with ions deposited by a Kauffman ion implantation process. A silicon dioxide layer with no or few metal contaminants is clearly compositionally different than a silicon dioxide layer having greater levels of metal contamination.

Thus, while the method limitations may be interpreted in light of the resulting structure, the Examiner cannot ignore the fact that the particular method used affects the resulting structure, i.e., a structure doped with ions by a plasma source ion implantation process is not the same as one formed by a Kauffman ion implantation process.

Rejection of claims 9-12 and 14 under 35 U.S.C. §112, second paragraph, as being indefinite.

At page 14 of the Answer, the Examiner maintained the position that the limitation "has reduced sputtered metal contaminants in comparison with a layer of silicon dioxide doped with ions deposited by a Kauffman ion implantation process" renders the claim indefinite. The Examiner maintains that the metes and bounds of the claim are indefinite because one of ordinary skill in the art would not know what level of metal contaminants is required to meet this limitation. Appellant disagrees and submits that one skilled in the art would understand that the claim is clearly conveying that the manner in which the layer is doped, i.e., plasma source ion implantation, results in a silicon dioxide layer having fewer metal contaminants than if (the same) layer were doped with hydrogen ions were implanted using a Kauffman ion implantation technique.

Further, the previous Board Decision in this application provides support to appellant's position. At page 15 of the Answer, the Examiner admits that appellant's specification describes a process that produces a semiconductor device in which the possibility of metal contamination is reduced when compared to the prior art Kauffman ion source implantation technique as supported by the Board, but asserts that "Appellant's specification does not necessarily suggest that a certain plasma source ion implantation process would produce reduced sputtered metal contaminants in comparison with any arbitrary Kauffman ion implantation process." However, the specification need not describe the specific parameters of the Kauffman ion implantation process in order for the claim to be clear. The claim clearly conveys that the use of plasma source ion implantation results in a silicon dioxide layer having fewer metal contaminants than if (the same) layer were doped with hydrogen ions implanted using a Kauffman ion implantation technique. Claims 9-12 are in compliance with §112, second paragraph.

With regard to claim 14, the Examiner asserted at page 16 of the Answer that "A semiconductor substrate commonly refers to a substrate formed of a semiconductor material, and Appellant uses a term 'a semiconductor substrate' as a substrate which forms a semiconductor device regardless of the material." Appellant strongly disagrees. The recited materials in the claim language "a semiconductor substrate formed from a material selected from the group consisting of silicon dioxide quartz and glass" are commonly used to form the substrate on which a semiconductor substrate is fabricated and would be understand by those skilled in the art. Appellant has not provided two definitions for the term "semiconductor substrate," contrary to the Examiner's assertion. Claim 14 is definite and in compliance with 35 U.S.C. §112, second paragraph.

Rejection of claim 9 under 35 U.S.C. §102(a) as being anticipated by "Applicant's admitted prior art."

At pages 17 and 18 of the Answer, the Examiner maintained that because appellant has not claimed specific operating parameters of a Kauffman ion implantation process, "one Kauffman ion implantation process would inherently produce reduced sputtered metal contaminants in comparison with another Kauffman ion implantation process." Appellant wishes to reiterate that the explicit language of the claim refers to the comparison of a silicon dioxide layer deposited with ions by a plasma ion source implantation process with that of the (same) silicon dioxide layer deposited with ions by a Kauffman ion implantation process. There is nothing in the claim language and no evidence presented by the Examiner which would lead one to conclude that using a Kauffman ion implantation process in one instance would provide reduced sputtered metal contaminants when using the same Kauffman ion implantation process in another instance.

Appellant further notes the Examiner's speculation that the limitation "having been doped with hydrogen ions by a plasma source ion implantation process" is merely a product-by-process limitation that "does not structurally

distinguish the claimed invention over the prior art." Appellant has previously pointed out that the method by which the layer has been formed directly affects the composition of the final product with regard to the level of metal contaminants in the silicon dioxide layer. Claim 9 is not anticipated by the "APA."

Rejection of claims 9 and 10 under 35 U.S.C. §102(b) as being anticipated by Zhang et al. (US 5,946,585) as evidenced by Nakanishi et al. (US 6,265,247).

The Examiner maintains that because he believes the claim limitation "having been doped with hydrogen ions deposited by a plasma source ion implantation process" is a product-by-process limitation, he asserts that Zhang et al. and Nakanashi et al. inherently teach a layer of silicon dioxide comprising hydrogen ions formed by plasma CVD.

However, as previously pointed out, the method by which the layer has been formed directly affects the composition of the final product with regard to the level of metal contaminants in the silicon dioxide layer. And, neither Zhang et al. nor Nakanashi et al. teach or suggest doping the surface of a silicon dioxide layer with hydrogen ions deposited by a plasma source ion implantation process as claimed.

Thus, one skilled in the art would certainly not conclude from reading Zhang or Nakanashi et al. that a doped layer of silicon dioxide as claimed would have a reduced level of sputtered metal contaminants when compared with a layer of silicon dioxide doped with hydrogen ions deposited by a Kauffman ion implantation process.

The Examiner continues to reason that "since no Kauffman ion implantation process is conducted during the manufacturing of the device of Zhang et al., it is inherent that the silicon dioxide layer disclosed by Zhang et al. as evidenced by Nakanashi et al. has reduced sputtered metal contaminants in comparison with a silicon dioxide doped with ions deposited by 'a Kauffman ion implantation process.'" The Examiner's logic is clearly flawed. The Examiner has failed to show that Zhang et al. disclose every feature of the claimed invention, either explicitly or inherently, which is the required factual basis for anticipation. Claims 9 and 10 are patentable over Zhang et al. as "evidenced by" Nakanashi et al.

Rejection of claim 14 under 35 U.S.C. §102(b) as being anticipated by Shufflebotham (US 5,711,998)

With regard to claim 14, the Examiner has again taken the position that the limitation "having hydrogen ions implanted therein by plasma source ion implantation" does not structurally distinguish the claimed invention over the prior art. Appellant disagrees. Shufflebotham does not teach or suggest a layer of silicon dioxide which has been doped with hydrogen ions deposited by a plasma source implantation process as claimed. Thus, claim 14 cannot be anticipated by Shufflebotham.

Rejection of Claims 10-12 under 35 U.S.C. §103(a) as being unpatentable over Burns et al. (Principles of Electronic Circuits, pp. 380-381) in view of "Applicant's Admitted prior art."

At page 24 of the Answer, the Examiner asserts that he relied on the APA as a secondary reference "to show that the silicon dioxide layer disclosed by Burns may have hydrogen ions implanted by a Kauffman ion implantation process." The Examiner then asserts that the "APA inherently teaches the

silicon dioxide has reduced sputter metal contaminants in comparison with a layer of silicon dioxide doped with ions deposited by 'a Kauffman ion implantation process.'" However, as appellant previously pointed out, the APA does not teach or suggest that a silicon dioxide layer deposited with ions by a plasma ion source implantation process compared with that of the (same) silicon dioxide layer deposited with ions by a Kauffman ion implantation process would have reduced metal contaminants.

Claims 10-12 are patentable over Burns in view of the APA.

Rejection of claim 14 under 35 U.S.C. §103(a) as being unpatentable over Murata et al. (US 5,576,229) in view of "Applicant's admitted prior art."

The Examiner again asserts that he used the APA as a secondary reference to show that the silicon dioxide layer disclosed by Murata et al. may have hydrogen ions implanted by a Kauffman ion implantation process, and that the APA inherently teaches the silicon dioxide has reduced sputter metal contaminants in comparison with a layer of silicon dioxide doped with ions deposited by 'a Kauffman ion implantation process." Appellant submits that claim 14 is patentable for the same reasons discussed above with regard to claims 10-12.

Conclusion

Appellant submits that the claims are not anticipated by the cited prior art, none of which teach or suggest a silicon dioxide layer having been doped with hydrogen ions deposited by a plasma source ion implantation process, where the layer of silicon dioxide has reduced sputtered metal contaminants in comparison with a layer of silicon dioxide doped with ions deposited by a Kauffman ion implantation process.

Respectfully submitted,

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